Synthesis

R&D Digest of Universiti Putra Malaysia

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What's Next

Highlights from the next issue –

- *JESKYL- a genetically improved vaccine*
- *Pari-Z- underwater unmanned vehicle for maritime surveillance*
- *Bile Salt Hydrolase for Hypercholesterole mia*

Heading forward *towards excellence*

Tan Sri Dato' Seri Dr Zainur Ariff Hj Hussain, the Chairman of UPM Board of Directors in his address to the campus community and Alumni during a Yayasan Pak Rashid Distinguished Lecture held at UPM on 1 October 2004, on the pertinent topic, "UPM - Rethinking and Revisit" reiterated that while UPM advanced in line with Malaysia's aspiration of excellence, glory and distinction, the University must stay as a significant player in contributing to the growth of the nation and ensuring quality teaching and research can create new sources of wealth and income particularly for the rural community. A new terminology common meaning to everyone was introduced 'TURPA" or *"Turun Padang"* or going to the field, was a call for everyone to broaden their horizons, go to the ground and reach out to the communities in all aspects of teaching and research.

Tan Sri Dato' Seri Dr Zainur Ariff Hj Hussein

The lecture created an impact on the audience, the implications that everyone must share the goals of UPM. Tan Sri Zainur stressad, *"Complacency is dangerous and we have to realise our vision in order to be globally competitive"*.

UPM Alumni organises series of these lectures as a platform for academic discourse for the campus community and the Alumni. Various current topics related to agriculture and education are discussed to highlight UPM's contribution to the growth of such sectors.

This lecture series significandly attracted the campus community and alumni to put forth their common views, concern and commitment to support UPM.

The Role of Metabolic Enzymes in the Development of Resistance in Cocoa Mirid, *Helopeltis Theivora* Waterhouse

Rita Muhamad Awang, Dzolkhifli Omar and Tan Soon Guan

Topical bioassays were conducted to evaluate the toxicity of deltamethrin, cypermethrin, γ-HCH and chlopyrifos against 3 populations of *H. theivora* namely the cocoa populations (Serdang, Selangor) and Sungai Tekam, Pahang) and tea population (Banting, Selangor). The synergistic effects of piperonyl butoxide (PBO), maleic acid diethyl ether (MADE) and s,s,s-tributyl phosphorotrithioate (DEF) were also tested using similar technique. Based on the LD_{50} values, the toxicity of the insecticide tested for the Serdang and Sungai Tekam populations were chlopyrifos > γ-HCH > cypermethrin > deltamethrin; for the Banting population was γ-HCH > cypermethrin > chlorpyrifos > deltamethrin. The most toxic insecticide was chlopyrifos with LD_{50} value of 3.028×10^{-2} mg/L for the Sungai Tekam population. The synergism of PBO on cypermethrin was higher compared to other insecticides tested. Cypermethrin showed synergistic values of 13-fold followed by γ-HCH and chlorpyrifos with synergistic values of 7 and 6-fold, respectively for Sungai Tekam population. The DEF gave a synergistic value of 4-fold against all populations tested while MADE gave a synergistic value of 6-fold against Sungai Tekam population. These results showed that monooxygenases were very active in the Sungai Tekam population. The increased in synergism of DEF indicated there were increase in enzyme activities of esterases.

Damage symptom on cocoa pods

■ *Turn to Page Nine*

Editorial

Perspectives: Research Resources

WHY SCIENTIFIC WRITING?

Research excellence should have impact, and one way of measuring scholarly impact is in terms of publications in refereed journals, conference proceedings, books, and other academic channels—scientific writing. As practiced in leading research universities, UPM's assessment of research impact incorporates external reviews by reputable scholars.

A good well-written scientific paper explains the scientist's motivation for doing an experiment, the experimental design and execution, and the meaning of the results. Scientific papers are written in a style that is exceedingly clear and concise. Their purpose is to inform an audience of other scientists about an important issue and to document the particular approach they used to investigate that issue.

Usually, a well written scientific paper will comprise an Abstract, Introduction, Methods, Results, Discussion and Literature Cited. Other sections can be included as necessary. It is important to understand the differences between sections and to put information in the appropriate location.

Beginning with the exciting material and ending with a lack of luster often leaves us disappointed and destroys our sense of momentum.

When you write about scientific topics to specialists in that field of science, we call that scientific writing. When you write to non-specialists about scientific topics, it is called science writing.

Good English is critical in scientific writing. In fact, scientists try to be so concise that their English should be better than that of workers in other disciplines!

Science is often hard to read. Most people assume that its difficulties are born out of necessity, out of the extreme complexity of scientific concepts, data and analysis. We argue here that complexity of thought need not lead to impenetrability of expression; we demonstrate a number of rhetorical principles that can produce clarity in communication without oversimplifying scientific issues. The results are substantive, not merely cosmetic: Improving the quality of writing actually improves the quality of thought.

The fundamental purpose of scientific discourse is not the mere presentation of information and thought, but rather its actual communication. It does not matter how pleased an author might be to have converted all the right data into sentences and paragraphs; it matters only whether a large majority of the reading audience accurately perceives what the author had in mind. Therefore, in order to understand how best to improve writing, we would do well to understand better how readers go about reading. *Readers do not simply read; they interpret!*

If the reader is to grasp what the writer means, the writer must understand what the reader needs.

Executive Editors
zulkifli@agri.upm.edu.my
fakhrul@eng.upm.edu.my

Spotlight

Nanotechnology in Sharp *focus*

Malaysia needs trained professionals who are able to exploit emerging opportunities in the "omnipotent" field of Nanotechnology

Nanotechnology derives its name from nanometer, (10^{-9} Meter or a billionth of a meter) and refers to the manipulation of matter at the atomic and molecular level. Viewed as the "next transformative technology like the Internet or electricity." Nanotechnology can be used for developing better mantles for liquid fuel lanterns and efficient thermoelectric and thermionic elements for efficient energy systems. Introduced in Richard Feynman's famous 1959 speech, in which the physicist suggested that machines could be developed with atomic precision, Nanotechnology is now creating waves in the sphere of scientific research and beyond. Multinational corporations including pharmaceutical companies are investing in Nanotechnology research. Countries like the US and Germany have reportedly committed millions of dollars towards Nanotechnology research. Malaysia, too, is gearing up to face the challenge.

Nanotechnology is an interdisciplinary area that includes the principles of Physics, Chemistry, Biology as well as Engineering. It calls for the lines between science, mathematics and engineering to blur. In this, scientists view an object on the nano-scale at which the properties of the element change. By controlling the size, they can change the structural, magnetic or optical characteristics of the object. "Nanotechnology will require you to radically rethink what your core business is, who your competitors are, what skills your workforce needs, how to train your employees, and how to think strategically about. Developing countries wanting to be part of 'the next industrial revolution' will need to build their capacity for transforming nanotechnology research into commercial ventures. Areas where Nanotechnology has already been applied: medical & pharmaceutical, energy production and distribution, textiles, telecoms, chemicals, materials, environment, Information technology, defence, automotive and aerospace. The advantages of this technology lies in the fact that products can be 5 times as strong, 10 times as efficient, and millions of times compact or better. In addition these can be designed in days and can be distributed in hours. Products can even be Pre-Designed. Through work in Nanotechnology started more than two decades ago, it gathered pace in the mid-nineties when advanced equipment became available. Now techniques have been developed through which we can reduce the dimension (of the object), observe the phenomena and exploit them.

Nanotechnology can have wide-ranging applications in various areas such as in medicine, chemicals, electronics, and Information Technology. It can be employed in drug delivery and manufacturing tinier chips, smaller and faster machines, amongst other things. The potential seems limitless; while the prospects are enormous, the challenges are also huge!

Already, Malaysian researchers are looking at building intelligent nano-robots that can be injected into the bloodstream to fight diseases. Another breakthrough being explored is the creation of carbon nanotubes to replace silicon for super fast, power-efficient computer chips. Currently, among the nanotechnology research activities undertaken by universities and research institutes in Malaysia are Micro-Electro-Mechanical System (MEMS); Nanochemistry; Nanomaterials/ surfactants; Molecular Nanotech; Nanomedicine and Electronics; and Nanocomposites.

These research activities are to meet Malaysia's long term objectives, which aims to nurture a Nanoscience research culture among researchers in Malaysia; develop the National Nanoscience Laboratory in Malaysia which meets international standards; and to be able to produce Malaysian Nanoscientists.

Houston as a leading centre of Nanotechnology research offers various opportunities for collaboration between USA and Malaysia in this field.

Malaysia needs trained professionals who are able to exploit emerging opportunities in this "omnipotent field". There may be high calibre scientists in Malaysia who possess the know-how in the field of Nanoscience but the younger generation of researchers has to be trained.

Graduates in any discipline of Science, engineering or technology; can take up Nanotechnology at the postgraduate level. It should be noted that Nanotechnology is not a subject like Physics or Chemistry.

Managing Editor
ndeepe@admin.upm.edu.my

Serdang:
Memories of the First Malaysian Veterinary School[1]

For most of the Twentieth Century, Malaysians were trained either in Pakistan and India or in Australia, Canada and UK. The former, named Indo-Pak graduates, could be employed in the government sector only as Assistant Veterinary Officers (AVOs) whereas the latter, were appointed as Veterinary Officers (VO) and enjoyed better salaries because of their eligibility for registration with the Royal College of Veterinary Surgeon (RCVS) (UK) and had the privilege of using the title MRCVS.

Then known as the Faculty of Veterinary Medicine and Animal Science was set up as one of the three pioneer faculties of UPM in 1971

First Malaysian Veterinary School

October 4, 1971, witnessed the birth of the Malaysian Veterinary School. The two Departments of Animal Science, University of Malaya's (Kuala Lumpur) and the College of Agriculture (Serdang), were combined to form one of the three foundation faculties in a new university at Serdang - UPM. And for the next 25 years, Professor Omar Abdul Rahman (1971-1978) and his successors, Professor Syed Jalaludin, (1978-1983), Professor Abdul Latif Ibrahim (1983-1993), Professor Tengku Azmi (1993-1997) and Professor Sheikh Omar Abdul Rahman (1997-2001), have led the Vet School to produce 847 DVM graduates by the end of 2004 and excelled in veterinary education and research, acknowledged worldwide.

Omar's Dream for RCVS Recognition

Professor Dr. Omar Abdul Rahman (1971-1978)

Omar embarked on a very ambitious mission hoping to develop the school at UPM of exceptional quality. His main objective was to combine both veterinary medicine and animal science in a single curriculum to suit the country's needs as wells as enthusiastic to gain RCVS recognition. He also named it the Faculty of Veterinary Medicine and Animal Sciences so as to avoid moving Animal Science component elsewhere.

Syed Jalaludin's Drive for Academic Excellence

Professor Dr. Syed Jalaluddin Syed Salim (1978-1983)

On succeeding Omar as Dean of the Faculty in 1978, Syed believed that the academic staff ought to excel in research and despatched most of the academic staff for their PhDs. Currently over 40 of the 50 academic staff in the Vet School have obtained their PhD degrees from UPM, UK *(London, Cambridge, Reading, Bristol, Glasgow, Dublin, Liverpool, Edinburgh)*, USA *(Cornell, California,)* Australia *(Melbourne, Murdoch, Queensland)* Canada *(Guelph)* and Japan *(Kyoto)*.

The DVM curriculum

The 5-year DVM curriculum was tailored to meet the needs of the government veterinary service, enabling veterinarians to approach livestock problems in an integrated manner. An Animal Industry project in the final semester of the course made students to submit a 'mini' thesis. The 5-year DVM course started with a batch of 10, the enrolment averaged 30 but in the late 1980's, it rose sharply to 75 and has remained constant thereafter. At the end of 2004, overall population of students in the DVM programme was 360.

Infrastructure

At outset, the faculty was homeless. Subsequently, the university approved RM10 million for the Faculty complex of two buildings. In 1975, the Animal Science occupied the first building while the Pathology and Clinical Studies shared other facilities. Unfortunately Dr. Whittick the Canadian surgeon. had no space but to convert a female toilet to a fully air-conditioned surgery to perform some of the best orthopedic surgeries on dogs and cats. Finally in early 1978, the Clinical and the Pathology Departments and the Dean's Office moved to the second building ready to herald the graduation of the first batch of DVM graduates.

Postgraduate Training

Academic staff returning with their PhD degrees were qualified to accept postgraduate students for MS, MVM and PhD degrees from Malaysia, Middle East countries *(Iraq, Iran, Sudan, Ethiopia)* Indonesia, Thailand, Myanmar and China. By November 2004, the school has produced 65 PhD graduates while 39 have yet to complete.

Winds of Change

As UPM continues its forward journey towards corporatisation, several changes are occurring at the university level. In 1999 the staff of the animal science department were moved to the Agriculture Faculty but the courses taught in the DVM curriculum remain unaffected. This change also strengthened the teaching in the University Veterinary Hospital and other professional services.

ISO 9001

The year 2000 saw the Vet School reaching a milestone - ISO 9001 award - that no other vet school in the world has accomplished. At a special ceremony at the school auditorium, the Prime Minister of Malaysia Dr. Mahathir Mohamad presented the certificate to the Dean of the School Professor Sheikh Omar.

Vet School: Bridges the Gap

Within a span of 3 decades, UPM's Vet School has produced DVM graduates for nation building, produced a school of academic scholars whose excellence has attracted the attention of neighbouring countries for postgraduate studies, helped to unify two rival veterinary associations into a single Veterinary Association of Malaysia (VAM), and upper most the ISO recognition. These achievements promise a brighter future for the Serdang Veterinary School.

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[1] **The writer is Professor Emeritus Mohd Razeen Jainudeen and foundation head of the Department of Veterinary Clinical Studies, Universiti Putra Malaysia. He can be contacted at jain@pop.jaring.my.**

Mohd Razeen Jainudeen graduated with a BVSc in 1956 from the University of Ceylon. He was awarded a Smith-Mundt Fullbright scholarship in 1960 for postgraduate studies at Cornell University Ithaca, USA, and obtained a MS and PhD in three years.

Razeen proceeded on a Population Council NY postdoctoral fellowship to Washington State University at Pullman, Washington to work with Professor Hafez. His career began as a veterinarian. Besides treating sick pets and livestock, he treated domesticated elephants used for logging and ceremonial occasions. His skill in capturing domestic elephants, made him the most sought after elephant veterinarian in Sri Lanka in the 1960's.

In 1971, he spent two years at Wayne State University School of Medicine, Detroit on a Ford Foundation senior postdoctoral fellowship studying the reproductive biology of the macaque. He joined UPM in 1974 as an Associate Professor, Veterinary Clinical Studies and became the Head of the Department of Veterinary Clinical Studies for almost 15 years. Razeen continued his research on buffalo and cattle reproduction at UPM. He developed the techniques of embryo transfer, IVF, laparoscopy and ultrasonography. He has published over 150 papers which included 23 chapters in international text books and plenary papers in international conferences. Razeen's research findings published in international flagship journals attracted the attention of international organizations — FAO, IAEA, ACIAR and SIDA. That took Razeen on consultancies and expert missions to Ethiopia, Zimbabwe, Kenya, Pakistan, India, Thailand, Indonesia and the Philippines.

He has conducted three Workshops on behalf of the Commonwealth Veterinary Association for veterinarians from Malaysia, Sri Lanka, India, Pakistan, Kenya, Tanzania, Zimbabwe, Uganda, and Kenya.

Razeen was conferred the JSM in 1991. He retired as Professor of Animal Reproduction at the age of 63 in 1994 after serving 37 years as a university lecturer of which 21 years were spent at UPM. He then continued to offer his services at UBC, UPM.

Natural Spray Dried Pandan *(Pandanus amaryllifolius)* Powder: Production and Product Development

Award Winner

Tan Chin Ping, S.K. Loh, Y.B. Che Man, A. Osman and S.A.H. Nazimah

Drying is an ancient process used to preserve foods. It is the most common food preservation process. With literally hundreds of variants actually used in drying of particulate solids, pastes, continuous sheets, slurries or solutions, it provides the most diversity among food engineering unit operations. The quality of food powders is based on variety of properties depending on the specific application. In general, the final moisture content, the insolubility index, therheological properties and the bulk density are of primary importance.

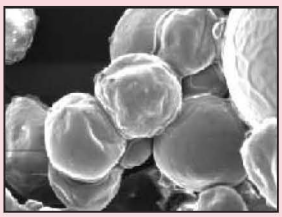


Image of spray-dried pandan powder scanned at x800

In recent years, natural food ingredients have been recognized for their health-promoting qualities. Therefore, much interest has been devoted to preparing flavoring and coloring compounds from natural sources by extraction, purification and isolation. In Malaysia, many fruits, plants, spices, and herbs contain natural flavoring and coloring compounds. The leaves of pandan *(Pandanus amaryllifolius)* have a strong aroma and are widely used in South East Asia as flavoring compound for various food products, such as bakery, sweets and even home cooking. The preparation of pandan extract for cooking is troublesome and difficult, since it involves many steps such as washing, trimming, blending and filtration. With this reason, Malaysian tends to search for alternative way to overcome this problem using artificial pandan flavor and artificial green color from the market. These artificial color and flavor are use because they are convenient to use as compared to traditional way of preparing the pandan extract. In recent years, natural food ingredients have been recognized for their health-promoting qualities.

A study on the production of spray-dried pandan powder was conducted and optimized using response surface (RSM). Optimization of the dehydration process is performed to ensure rapid processing conditions yielding an acceptable-quality product and a high-throughput capacity. Optimum conditions of 170°C inlet temperature and 6 rpm feed rate, with a constant outlet temperature of 90°C, were established for producing spray-dried pandan powder as an edible coloring and flavoring powder. The study also evaluated the effect of different types of carbohydrates, namely maltodextrin and gum arabic, in the production of spray-dried pandan powder. Product development of home made pandan ice cream was carried out to evaluate the effectiveness of spray-dried pandan powder as an ingredient in food. A combination of maltodextrin and gum arabic gave better results than using only maltodextrin or gum arabic in the formulation of spray dried pandan powder in terms of physicochemical properties and sensory scores. In general, the optimum condition for the formulation of pandan ice cream using spray dried encapsulated pandan powder was established. The developed drying techniques can be applied to produce encapsulated flavor and color powder fro use in various food products.

Spray Dried Pandan powder

GOLD – *UPM Invention and Research Exhibition 2002 (PRP 2002).*

Reader Enquiry

Faculty of Food Science and Technology
Universiti Putra Malaysia
43400 UPM, Serdang, Selangor
Malaysia

Tel: +603 8946 8418
E-mail: tancp@putra.upm.edu.my

Cost-efficient Production of the Shitake Mushroom on Sawdust Waste

Tan Yee-How, Mohd Noor Abd Wahab and Ganisan Krishnen

Award Winner

The shiitake (*Lentinula edodes*, commercially the premier mushroom in the world has traditionally been cultivated on hardwood logs. However due to a dwindling supply, long gestation period (2-3 years) and low yield (8-10%), this production method has become obsolete. A new technique with a six-fold increase in yield and 90% reduction in incubation time was developed by us (Tan & Chang, 1989).

This biotechnology involved inoculating mycelia (spawn into supplemented sawdust packed in plastic bags, creating synthetic logs. After spawn-run, when the substrate appeared visually to be fully permeated by mycelia with patches of brown pigmentation, the bag was exposed for fruiting with special techniques employed.

Shiitake mushrooms grown on natural wood logs

However this technology gave inconsistent yield and quality resulting from the failure to:

1. Pinpoint the exact time for opening the bags to initiate fruiting.
2. Establish precise environmental and cultural conditions for each strain.
3. Select objectively high biomass strains.

We have perfected a new precision technology for a cost-efficient, high-yield production of the shiitake mushroom:

Using morphogenetic markers in the form of developmental enzymes such as extracellular laccase and carboxymethylcellulase, we have overcome the major problem of determining when the mushroom is 'ready' to be fruited. We have found that laccase for example, increases during mycelial growth, peaks when growth is maximum, and decreases rapidly thereafter just prior to fruiting. A sudden drop in this enzyme's activity therefore constitutes the signal to expose bags to initiate fruiting.

Shiitake mushrooms cultivated on synthetic 'logs' of sawdust

We have formulated precise temperature-light-humidity-aeration regimes for 20 commercial strains whereby special fruiting techniques and substrate supplementation are employed to maximize yield.
In the selection for high biomass strains a modified chemical (chitin assay) technique is used that is superior to one based on visual estimation.

Two strains L 2161 and L2 were found to outperform the rest and offers exciting possibilities for commercialization with this new technology.

GOLD – *UPM Invention & Research Exhibition 2002 (PRP2002).*

Reader Enquiry

Department of Plant Protection
Faculty of Agriculture
Universiti Putra Malaysia
43400 UPM, Serdang, Selangor
Malaysia

Tel: +603 8946 7248
E-mail: alvinyht@agri.upm.edu.my;
alvinyht@yahoo.co.uk

Development of Ultrasonic and Microwave Techniques for *Detection of Decay in Wooden Cross-Arms*

Kaida Khalid, Mohd. Hamami Sahri, Sidek Abd. Aziz, Lai Sook Kean, Ng Kok Cheang and Roslim Mohd.

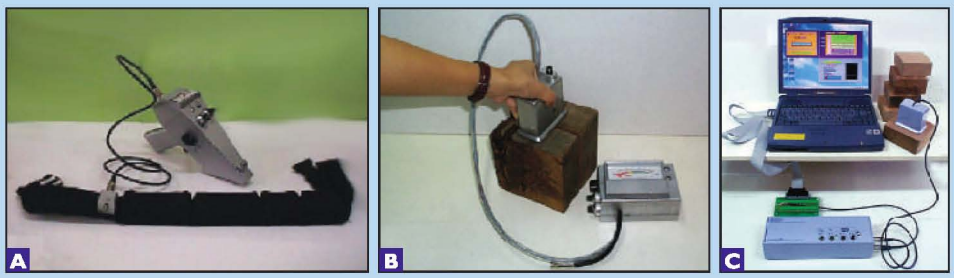
Award Winner

A wooden cross-arms as part of the transmission-line tower

Most of the cross-arms of the 275 kV and 123 kV transmission lines in Malaysia and certain counties are using hard wood especially from Chengal species. Due to natural weathering this wooden cross-arms is degraded and decayed. For safety reason there is a need for a simple, light, and accurate nondestructive decay detection.

In this project the microwave reflection technique and ultrasonic method which is based on the transit time have been developed of in-situ measurement. In this study, we categorize the decay on the wood into three stages of decays namely severely decay, incipient decay and sound wood. In microwave method these stages can be related to the amount of water that can be absorbed by weathered wood and secondly on the wood density at particular moisture content especially at EMC. This method is managed to detect inner decay up to 2 cm from the surface of the wood. In ultrasonic method, an investigation has been done to find suitable method of measurement, especially detection of decay under the metal block.

Ultrasonic transit time meter and a sample holder



Various types of microwave wood meter (A) wood moisture meter and decay level detection in wooden cross-arm (B) wood densitometer (C) computer-assisted wood densitometer

Applying this detection system, the transit times along L-L direction for sound wood, incipient wood, and cracked wood fall under the ranges of 100ms to 200µs, 200µs to 500µs, and above 500µs respectively. To complete the study, several prototypes have been developed, which can be used for field-testing or maintenance work. RMC

GOLD – *UPM Invention and Research Exhibition 2002 (PRP 2002).*
3rd Prize – *UPM Invention and Research Exhibition 2000 (PRP 2000).*

Reader Enquiry
Department of Physics
Faculty of Science
Universiti Putra Malaysia
43400 UPM, Serdang, Selangor
Malaysia

Tel: +603 8946 6605
E-mail: kaida@fsas.upm.edu.my

Fight against Cancer Cure – Tapioca!

Latifah Saiful Yazan, Foo Hooi Ling, Raha Abdul Rahim and Loh Teck Chwen

Award Winner

UPM scientists are researching the possibility of using *tapai ubi*, or fermented tapioca, as a prevention against cancer.

Lactobacillus plantarum UL4 (Lactic Acid Bacteria) isolated from local tapai ubi (fermented tapioca, *Manihot esculanta*) is able to produce bacteriocin (designated as bacteriocin UL4) that shows broad inhibitory activities towards a numbers of pathogens, such as *Bacillus cereus, Escherichia coli, Streptococcus pneumoniae, Staphylococcus aureus, Salmonella typhimurium, Enterococcus faecium and Listeria monocytogenes*. Bacteriocin UL4 not only can withstand high temperatures up to 121°C for 15 minutes but is also stable at temperatures below 15°C for up to 60 days.

As for pH tolerence, the bacteriocin UL4 is also tolerable to broad pH range, which includes acidic (pH 2-5) and basic (pH 7-8) pH. The physiological effects of bacteriocin UL4 have been studied by feeding to post weaning rats as feed additive.

The feeding trial results demonstrated that it could reduce the total plasma cholesterol concentration and the Enterobacteriaceae counts significantly as compared to the control group. Under the study conducted at UPM, the bacterioicin UL4 also exhibited positive in vitro cytotoxic activities towards a few cancerous cell lines, for instances breast carcinoma (estrogen receptor-positive MCF7 and estrogen receptor-negative MDA MB231), cervical adenocarcinoma (HeLa), ovarian cancer (CaOV3) and acute promyelocytic leukaemia (HL60) cells.

Latifah showing a sample of the bacteriocin extracted from fermented tapioca

However no detailed study has been carried out yet to evaluate the cancer chemopreventive activities of bacteriocin. By knowing the potential of the bacteriocin to fight various malignancies, this work is proposed to assess its anti-tumour promoting activity on mice induced with skin cancer. Our preliminary tests indicated that seven types of cancer, including cervical, ovarian, breast and leukaemia, could be prevented by eating *tapai ubi*. RMC

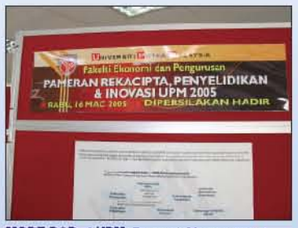
MAKNA Award – *National Cancer Council of Malaysia Award 2004*
MTSF Award – *Malaysia Toray Science Foundation Award 2004*

Reader Enquiry
Department of Biomedical Science
Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
43400 UPM, Serdang, Selangor
Malaysia

Tel: +603 8946 8440
E-mail: latifah@medic.upm.edu.my

ResearchHappenings

Invention, Research and Innovation 2005 (PRPI2005) *(1– 19 Mar. 2005)*



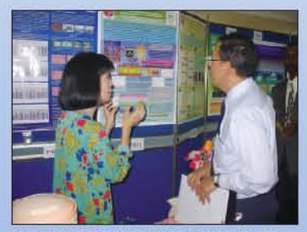
MORE R&D at UPM: Research Mmanagement Centre organised Invention, Research & Innovation 2005 Exhibition held at various Faculties, Institutes across the campus from 1-19 March 2005

RECOGNITION OF CONTRIBUTION: Judges evaluating exhibits for awards

MUTUAL BENEFITS: Dr. Maznah Ismail from the Faculty of Medicine & Health Sciences emphasizing on ethical manners in R&D

JUST REWARD: Exhibitors wait to being nominated for UPM R&D awards —Gold, Silver or Bronze!

ACTIVITIES GALORE: Prof.Wan Ishak, Director, ITMA showcasing his exhibit to the panel of Judges



INFORMATIVE: A keen exhibitor explaining her research

National Intellectual Property Day 2005 *(3–6 Mar. 2005)*

SEAL OF APPROVAL: Ir.Retnasamy Muniandy briefing the Prime Minister Datuk Seri Abdullah Ahmad Badawi

COMMUNICATING: A postgraduate researcher motivating school students on R&D at UPM

ISO Template Workshop *(18 Jan 2005)*

FACING THE FACTS: ISO will help UPM academicians in raising its image internationally

ENGROSSED: Dr. Fakhru'l-Razi Ahmadun, Deputy Director, RMC (right) scrutinising ISO procedures while Mustapha Kamal (centre), Asst.Registrar, RMC and Mohammad Azlan (left), Administrative Officer, INSPEM show keen interest during the ISO workshop

Lecturer's Month *(27-29 December 2005)*

AT YOUR SERVICE: The former RMC Director, Prof. Mohd. Shahwahid during his opening remarks at the function

EDUCATIONAL: Dr. Azizah Othman from Faculty of Food Science & Technology with her motivating talk on R&D

DYNAMIC FORCE: Prof. Kaida Khalid, "R&D will help UPM promote its research skills"

Malaysia Toray Science Foundation Award (MTSF) *(13 Dec 2004)*

MTSF Prize Presentation Ceremony: from left: Prof. Mohd. Shahwahid former RMC Director, Dr. Latifah Saiful and YBhg.Tan Sri Dato' Dr. Syed Jalaludin Syed Salim, Chairman, Examination Committee

QUEST FOR EXCELLENCE: Dr. Latifah receiving the MTSF award from YB Datuk Prof. Dr. Mohd Ruddin, Parliamentary officiated by YB Dato Sri Dr Jamaludin Mohd Jarjis, the Hon. Minister of Science Technology & Innovation held on 13 Dec 2004

IN RECOGNITION: Dr. Latifah (left) and Lim Moon Nian (extreme right), the two recipients of the MAKNA Cancer Research Award 2004 with officials of MAKNA

Vice-chancellor's Visit to Poland *(27 Nov—5 Dec 2004)*

FOSTERING TIES: Visit to Wroclaw University of Technology (WUT), Poland by UPM's 4-member team

COMING TOGATHER: UPM's Vice Chancellor, Professor Dato' Dr. Ir. Mohd. Zohadie Bardaie building goodwill with officials from WUT

EXPANDING HORIZON! UPM's visit to Poland carved a path for future scientific collaborations between UPM & renowned Polish universities

EXCHANGING VIEWS: Smart partnership for mutual gain

PARADIGM BASHERS: a discussion of great interest

Down the Memory Lane *(Newsmakers around the campus)*

FAREWELL: Words of kindness by the outgoing deputy director, RMC, Assoc. Prof. Dr. Sidek at the farewell luncheon on 14 Jan 2005

CARING GESTURE: Managing Editor, Nayan receiving a token of appreciation on behalf of Publication & Promotion Unit, RMC from Dr. Sidek

FOR THE RECORD: front row (from left): Nayan, Dr. Sidek, Rizal; back row (from left): Aarl, Zaihan, Nurhaznita & Nasimi

KNOWING ME, KNOWING YOU: Dr Sidek sharing words of wisdom with his unit members— (from left) Nurhaznita, Zaihan & Nasimi

Tête-à-Tête: expression of views—we hope to continue to do the best and boost further quality research publications assures Nayan

HAPPY MOMENT: Dr. Sidek sharing his experiences with Nayan & Dr. Nor Aripin

UNFORGETTABLE DAY: Dr. Sidek at his luncheon hosted by RMC on his farewell

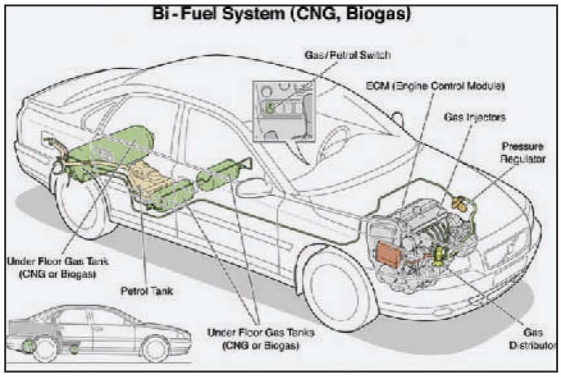
ALL SMILES: RMC staff enjoying their meal during Dr. Sidek's farewell luncheon

Ergonomic Design of Vehicles Using Natural Gas

Rosnah Mohd. Yusuff, Lo Woon Chek, Barkawi Sahari and M.M.H. Megat Mohamad

Award Winner

The use of natural gas in vehicles (NGVs) as an alternative fuel is increasing worldwide. Compared with vehicles fuelled by conventional diesel and gasoline, NGVs can produce significantly lower amounts of harmful emissions such as nitrogen oxides, particulate matter, and toxic carcinogenic pollutants and reduce emissions of carbon dioxide. In US the growth of NGVs are expected to increase to 12 million in 2010 (Guo, 1996). Japan, although an importer of natural gas, had made plans to increase NGV up to 3000 and CNG fueling stations by 2000 sites in the year 2000.

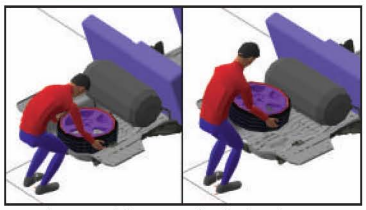


Example of bi-fuelled NGV available in the market – Volvo S80 (OEM)

In Malaysia, there are currently about 7,000 vehicles powered by natural gas, mostly conventionally fuelled vehicles that have been converted to run on natural gas. The fuel system uses a combustible natural gas (CNG) conversion kit which is added to a vehicle without any major modifications to the vehicle's system. Natural gas is not only more environmental friendly, it is also cheaper as the cost of CNG fuel is only about a third of that of petrol. Since its benefits to the environment and public health, its abundance and cheaper cost, the use of natural gas as the sole energy source has been considered in car design.

However, the use of natural gas in vehicles provides other challenges such as the safety and design changes required to the vehicle. The location of the mounted container, space availability and requirement, additional weight to the vehicle, ease of maintenance, assembly and disassembly of new components create new impact on the vehicle design. The impact of these changes to the design of the vehicle from the ergonomics aspects will be considered, evaluated and analyzed to ensure comfort, safety and ease not only to the users but maintenance and assembly operators. Various design configurations will be considered using human modeling tools such as ManneQuinPro and ENVISION/Ergo. The design of the natural gas vehicle considers among other things, frequency of refueling, speed, travel distance and that the performance of the vehicle is at least level with that of a petrol-fuelled car.

Since natural gas vehicles offer many benefits, from improving public health and the environment, it is said that NGVs are leading the way to a better tomorrow-today.



Simulation to lift spare wheel after the installation of CNG container

Installation of CNG container in the luggage compartment of the vehicle

Reader Enquiry

Department of Mechanical and Manufacturing Engineering
Faculty of Engineering
Universiti Putra Malaysia
43400 UPM, Serdang, Selangor
Malaysia

Tel: +603 8946 6342
E-mail: rosnah@eng.upm.edu.my

Putra Blok – Interlocking Load-bearing Hollow Block

Mohd. Razali Abdul Kadir, Abang Abdullah Abang Ali, Mohd. Salleh Jaafar, Abdul Aziz Abdul Samad, Rahinah Ibrahim, D.N. Trikha and Waleed A.M. Thanoon

Award Winner

PATENTED GB2361254B MY115629A INNOVATIVE R&D

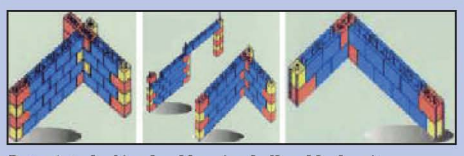
PUTRA BLOK is an invention of the Housing Research Centre, Universiti Putra Malaysia. It is a new, innovative, interlocking load bearing, hollow block building system, designed to satisfy the modular coordination requirement as a part of the 'open' Industrialised Building Systems (IBS) concept.

The main idea of Interlocking Hollow Block System (IHBS)-PUTRA BLOK is the elimination of the mortar layers. The blocks are interconnected through the provision of protrusions and grooves. The elimination of mortar layers in the IHBS will speed up construction and reduce the number of skilled and unskilled workers required to construct identical mortar blocks.

The interlocking block system is therefore being promoted as a new building technique that will not only result in reduced costs but will speed up the construction process as a result of the elimination of mortar layers. As they are light with self-aligning features, the interlocking hollow blocks can be assembled much faster compared to the conventional mortar masonry construction.

Three different interlocking block units were developed to assemble a wall unit i.e. corner block, Half block and the Stretcher block.

Stretcher Block *Corner Block* *Half Block*



Putra interlocking load bearing hollow block units

In addition, the assembled blocks provide continuous hollow voids that can be used to host ties or stiffeners in vertical and horizontal directions. Unskilled labor, although not familiar with the system, found it easy and simple for construction purposes. No formwork was used in the construction of the house. The lintels or beams were embedded in the block thus further reducing construction time.

The Interlocking Hollow Load bearing Block Building System has won many National and International awards and has been granted Patents under UK Patent number **GB2361254B** and Malaysian Patent number **MY115629A**.

SILVER – *British Inventions Society 2004 (BIS, London, UK)*
SILVER – *Ideas-Inventions-New Products 2004 (IENA, Germany)*
CIDB Award – *Construction Industry Development Board Award 2002*
GOLD – *International Exhibition of Inventions, New Techniques & Products 2001, Geneva*

Reader Enquiry

Department of Civil Engineering
Faculty of Engineering
Universiti Putra Malaysia
43400 UPM, Serdang, Selangor
Malaysia

Tel: +603 8946 7849
E-mail: razali@eng.upm.edu.my

Microbial Bioconversion of Domestic Wastewater Treatment Plant (DWTP)

Sludge by LSB and SSB into Environmental Friendly Soil Nutrients for Ultimate Disposal

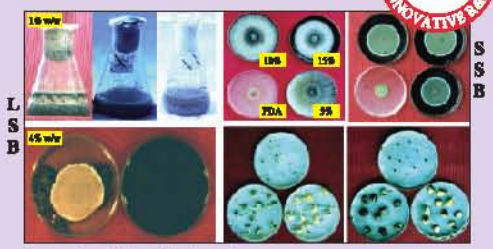
A. Fakhru'l-Razi, A.H. Molla and M.Z. Alam

Award Winner

The LSB (liquid state bioconversion) process was developed with controlled condition in a laboratory. In the LSB process, the filamentous fungi was isolated (Fakhru'l-Razi *et al.*, 2002a) from its relevant sources (wastewater, DWTP sludge and sludge cake). Immobilized and/or entrapped waste particles of Indah Water Konsortium (IWK) DWTP sludge was carried out through the filamentous mycelial formation of pellets/flocs (≤1% w/w of TSS). This has enhanced the settling and dewatering characteristics, and biosolids accumulation (2.5% w/w of TSS) of the treated sludge (Alam *et al.*, 2001b). The fungal growth and its secondary metabolites i.e. enzymes influenced the reduction of soluble organic substances present in the sludge and accelerated the bioconversion process significantly (Friedrich *et al.*, 1983, 1987; Jin *et al.*, 1999; Alam *et al.*, 2001b). In higher solids content sludge (≤ 4% w/w of TSS), the microorganisms only entrapped the solid particles, compressed the treated sludge with their filamentous mycelia that modified the porosity structure of biosolids and enhanced the dewaterability/filterability (Hamdi and Ellouz, 1992; Friedrich *et al.*, 1986) as well as bio-accumulation of treated DWTP sludge (Fakhru'l-Razi *et al.*, 2002b).

In the SSB (solid state bioconversion) process the end product is a value added organic fertilizer (compost) which exhibited superior potential in plant growth and development. Mostly, the process was conducted under laboratory conditions. In the SSB process, IWK domestic wastewater sludge (from drying bed or LSB) with 8-10% solids content was cured followed by separation of foreign particles and made more or less homogenous. Then it was sterilized after addition of bulking materials (sawdust and rice straw) and optimized process factors such as, co-substrate, pH, C/N ratio, and moisture level. Finally the 6% mixed fungal mixed inocula (approximately 3.5×10^3 spores/ml) was used for inoculation and incubated 75 days for bioconversion.

Generally in the SSB process the enhanced microbial growth for excretion of several enzymes helps the biological oxidation of the organic substrate. The aerobic biodegradation converts the substrate into CO_2, H_2O and relatively stable humus substances. The long chained carbon compounds becomes simpler ones. Therefore the organic materials are

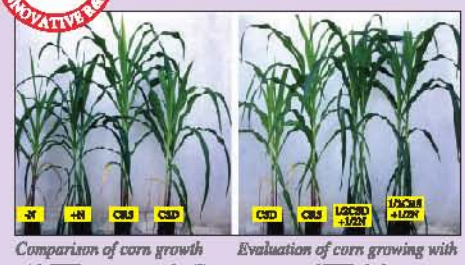


Screening of Fungal adaptation

modified by decomposition and humification through a wide variety of biological changes (Vuorinen, 2000). Generally biological oxidation is a dehydrogenation process and dehydrogenases are a very important group of enzymes for the composting process (Fang *et al.*, 1998). Moreover, the organic N is mineralized to ammonia by ammonification reactions as a result of the microbial activity. Then the ammonia undergoes different processes such as, volatilization, immobilization, denitrification and nitrification based on different situations (Sanchez-Monedero *et al.*, 2001).

Generally, this technique has opened a new biotechnological approach in the economic importance of treating lower (≤1% w/w of TSS) and/or higher (≤4% w/w of TSS) DWTP sludge by through enhancing the biosolids accumulation, bioseparation and biodegradation of treated sludge. This may contribute to better sludge management strategies in such a ways as (i) biosolids accumulation that can be used as pre-treatment material for rapid and effective composting by solid state bioconversion (Viéitez *et al.*, 2000, Molla, 2002) because it has large amounts of organic matter, macro- and micro-nutrients and there exist microbes for quick bioconversion and (ii) biodegradation of DWTP sludge supernatant that can be disposed without any further treatment and meets the standard values required for discharge (ILBS, 1999).

The SSB process is natural, non-hazardous and environmentally friendly compared to any one of the existing conventional and advanced techniques for wastewater sludge management and disposal. Moreover the SSB technique is permanent and sustainable. The end product is a value added organic fertilizer and therefore will not generate any



Comparison of corn growth with IWK composts vs fertilizer

Evaluation of corn growing with composts of IWK sludge

additional wastes. Obviously, it has potential to provide dual benefits; firstly, it ensures the ultimate disposal of wastes and, secondly, it provides a value added end product. The process is simple, low cost and easy to operate. Obviously, it is convenient and effective method for ensuring a congenial environment for human beings.

Both, solid state bioconversion of domestic wastewater treatment plant sludge into compost (SSB), and liquid state bioconversion of sewage treatment plant sludge (LSB) are Patent-pending under Malaysian Patent registration number **PI 20030942**, and **PI 20030941** respectively.

GOLD – *British Inventions Society 2004 (BIS, London, UK).*
Special SILVER – *British Inventions Society 2004 (BIS, London, UK).*
SILVER – *Ideas-Inventions-New Products 2004 (IENA, Germany).*
GOLD – *UPM Invention & Research Exhibition 2002 (PRP 2002).*
SILVER – *Expo Science and Technology 2002 (EXPO S&T 2002).*

Reader Enquiry

Department of Chemical and Environmental Engineering
Faculty of Engineering
Universiti Putra Malaysia
43400 UPM, Serdang, Selangor
Malaysia

Tel: +603 8946 6268, 8946 6183
E-mail: fakhrul@eng.upm.edu.my

....in Cocoa Mirid, ***Helopeltis Theivora*** Waterhouse

From Page One

Damage symptom on young cocoa shoots

These results indicated that this enzyme might also play a role in metabolism of chlorpyrifos, cypermethrin and deltamethrin for all the population tested. The resistance ratio of 25-fold for cypermethrin in the Banting population and 13-fold for chlopyrifos in the Sungai Tekam population were higher compared to Serdang population (susceptible population). The Sungai Tekam population showed increasing tolerance towards the insecticides tested compared to Banting and Serdang populations. Results indicated the impending resistance in the mirids. Formulation of chemical management is necessary to be integrated into the pest management of the pest. Effective resistance management in agricultural insect pests depends on early detection of the problem and rapid assimilation of the information on the resistant population.

SILVER – *UPM Invention and Research Exhibition 2002 (PRP 2002).*

Reader Enquiry

Department of Plant Protection
Faculty of Agriculture
Universiti Putra Malaysia
43400 UPM, Serdang, Selangor
Malaysia

Tel: +603 8946 7244
E-mail: rita@agri.upm.edu.my

Replication of New Castle Disease Virus in Breast Cancer Cell Lines

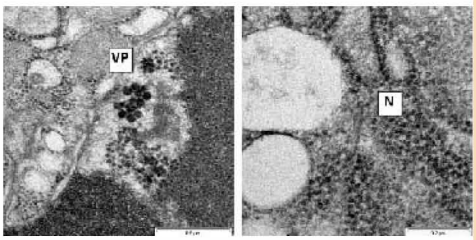
Award Winner

Fauziah Othman, Aini, I., Asmah, R., Omar, A.R., Manaf, M., Malin, J., Zolkapli, E., Nor Asiah M.N., Narayani, M., Hadiyatul–Hanim, M.T.H. and Tengku-Shahrul, T.M.Y

Breast cancer is the commonest cancer in women in most part of the world and refers to malignant tumor that is developed from the breast. Recently, there has been a renewed interest in the potential use of cytolytic viruses to cause selective destruction of tumors. A few viruses have shown to induce apoptosis of tumor cells such as mumps virus, nipah virus, adenovirus and Newcastle disease virus (NDV). NDV vaccines have been reported to be effective in some patients with advance cancer who had exhausted conventional cancer treatment. Infection of cells with virus often stimulates cellular self-destruction mechanism, known as apoptosis.

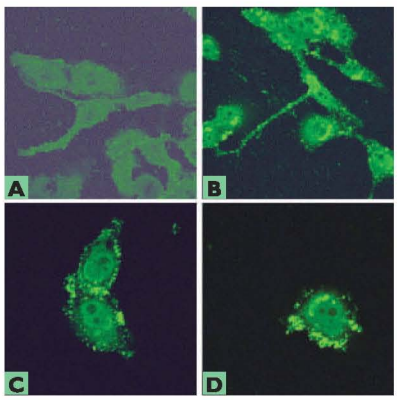
The objective of this study is to investigate the replication and morphological changes of breast cancer cell lines (MCF-7) infected with AF 2240 strain which is a velogenic Malaysian strain of NDV. The breast cancer cell line, MCF-7 is maintained in complete media RPMI 1640 supplemented with 10% fetal calf serum and 1% antibiotic penicillin-streptomycin in an atmosphere of 5% CO_2 at 37°C. Morphological features of infected cells and virus replication were studied by using transmission electron microscopy (TEM) and confocal laser scanning microscope (CLSM) and observation was done for 6, 12, 24, 36 and 72 hours post-infection. TEM observation revealed that AF 2240 strain of NDV induced apoptosis in MCF-7 breast cancer cell lines. When thin sections of infected cells were examined, the effect of infection was observed. Infection was associated with condensation of chromatin, shrinkage of total cell volume, membrane blabbing and constriction of both nucleus and cytoplasm into membrane bound apoptotic bodies.

These features indicate the occurrence of apoptosis. This research also demonstrated that AF 2240 strain of NDV is capable of replicating in the cytoplasm of tumor cells. Within the cytoplasm, inclusions were formed by accumulations of viral nucleocapsids surrounded by 'fuzzy' electron dense material. Electron microscopy has shown that nucleocapsids appeared in the cytoplasm at 6 hours and 12 hours post-infection. To confer this, immunolabelling technique was applied to detect the presence of NDV using CLSM. At 24 hours post-infection, particles accumulate and inclusions closely aligned the plasma membrane and vacuolar membrane as particles prepared to bud. Nucleocapsids aggregate within the cytoplasm and virus budding at vacuolar membrane were also observed at 36 hours post-infection. Meanwhile at 72 hours, virus budding became more dominant and a lot of virus particles were released into cytoplasmic region leading to explotion of the cancer cells into fragments known as apoptotic bodies.



***Replication of NDV** – Transmission electron micrograph of MCF-7 cells at 12 hours post-infection. Note virus particles (VP) and accumulation of nucleocapsids (N) in the cytoplasm*

This study had proven that this local strain of NDV can induce apoptosis in MCF-7 breast cancer cell lines. This study also suggests that this virus appeared to be well replicated in breast cancer cells.



Immunolabelling of NDV with polyclonal antibody in MCF-7cell line—(A) control (B - D) 24, 48 and 72 hours post-inoculation (B-D).

Bronze – *Institute of Bioscience Exhibition 2004, UPM.*
Bronze – *UPM Invention & Research Awards 2003 (PRP 2003).*
First Prize – *Best Confocal Micrograph, Langkawi, 2003.*
SILVER – *International Exhibition for Inventions, Innovations, Technology & Industrial Design (I-TEX 2003).*
GOLD – *UPM Invention & Research Awards 2002 (PRP 2002).*

Reader Enquiry

Faculty of Medicine and Health Sciences
Universiti Putra Malaysia
43400 UPM, Serdang, Selangor
Malaysia

Tel: +603 8946 8439, 8656 7840/43/45
E-mail: fauziah@medic.upm.edu.my

Reportage

From Page Twelve

FactFile

For the record

1 *Dr.Fakhru'l-Razi Ahmadun, incoming new deputy director, Publication, Promotion & System Unit, RMC*

2 *Dr.Sidek Abd. Aziz, outgoing deputy director, Publication, Promotion & System Unit, RMC*

1 Dr. Fakhru'l-Razi Ahmadun, Associate Professor and Lecturer in Environmental Engineering from the Faculty of Engineering took over as the new incoming deputy director Research Management Centre effective 16 January 2005. Dr. Fakhru'l heads the Publication, Promotion & System Unit of the Research Management Centre. He could be reached at 03 8946 6183 (RMC), 03 8946 6304 (faculty), or via email at fakhrul@eng.upm.edu.my

Fakhru'l joined Universiti Putra Malaysia in 1981 and became head of the Department of Chemical and Environmental Engineering, Faculty of Engineering from 1st July 1998 till 31 Jan 2004. He was awarded a MARA Scholarship to pursue tertiary education at Leeds University in 1976. He obtained his Doctorate in Environmental Engineering in 1994 from the University of Newcastle upon Tyne (UK).

Fakhru'l-Razi's research interests are in the areas of environmental engineering, nanotechnology; and safety and emergency management. He has more than 170 publications of which over 70 are in various journals related to environmental engineering, nanotechnology, and emergency and disaster management.

He has to his credit received several national and international awards for various research achievements. In addition, he has also received the Emerald Highly Commended Award 2003, and the Swiss Inventors and Patent Holders Special Award recently at IENA 2004 in UK and Germany. In addition, he holds various international professional affiliations.

2 Associate Professor Dr. Sidek Hj. Abd. Aziz, outgoing deputy director, Research Management Centre left the Centre on 15 January 2005 with reflective memories of his sheer hard work and commitment to the Centre. Ever since his appointment with RMC in November 2001 as the head of the Publication, Promotion & System Unit, he was actively involved in conducting and successfully organising various exhibitions at both national and international levels. In a nutshell, the unit owes its success to his creditibility.
He could now be reached at 03 8946 6682 (faculty), or via email at sidek@putra.upm.edu.my.
(Turn to centre page for pictorial news.)

RMC Updates

The Publication & Promotion Unit of the Research Management Centre (RMC), UPM is now known as Publication, Promotion & System Unit.

Read this – a call for contributions!!

If you have any contributions comprising feature articles or research write-ups that you would like us to publish in the esteemed columns of Synthesis, or any suggestions that you may wish to make for the forthcoming issues, please send them to: The Managing Editor, Synthesis, Publication, Promotion and System Unit, Research Management Centre, 4th Floor, Administration Building, 43400 UPM, Serdang, Selangor, Malaysia or via the Internet to ndeeps@admin.upm.edu.my or rschinfo@admin.upm.edu.my
The editor reserves the right to edit articles for clarity and space before publication.

A Glance at Research Inventions & Innovations at UPM[1]

Continued from Issue 7, 4th Quarter (Dec.2004)...

No.	Faculty/ Institute	Researcher	Innovation	Research Cluster	Project Number	Allocation
179.	Food Science and Biotechnology	Raha Abdul Rahim	Construction of Local Lactococcus Recombinant Vaccine Against Cholera	BAB	09-02-04-0335 EA001	RM229,000
180.	Food Science and Biotechnology	Roselina Karim	Development of Frozen Dough Based for Traditional Malaysian Cakes	AFF	03-02-04-0161 EA001	RM263,700
181.	Food Science and Biotechnology	Rosfarizan Mohamad	Utilization of Fed-batch fermenter for high density cell cultivation of beneficial bacterium (Bacillu subtilis) for aquaculture industry	AFF	09-02-04-0337 EA001	RM192,680
182.	Food Science and Biotechnology	Rosfarizan Mohamad	Development of fed batch fermentation process for improvement of phytase production by Aspergillus ficuum		09-02-04-0706-EA001	RM158,500
183.	Food Science and Biotechnology	Russly Abdul Rahman	Application of Vacuum Processing and Cook-chilled Technology for the Production of Savoury-rice Meals	AFF	03-02-04-0163 EA001	RM231,952
184.	Food Science and Biotechnology	Salmah Yusof	Enhancement of Quality and Storageability of Clarified Banana and Sapodilla Juices	AFF	01-02-04-0106 EA001	RM188,952
185.	Food Science and Biotechnology	Son Radu	Development of Diagnostic DNA Probe for Detection and Identification of Vibrio cholerae	HAS	06-02-04-0219 EA001	RM132,000
186.	Food Science and Biotechnology	Son Radu	Microbial Prospecting for Bioactive and Useful Substances	BAB	09-02-04-0452 EA001	RM142,000
187.	Food Science and Biotechnology	Suhaimi Napis	Diversity Analysis of Local Durian Clones Using Intergenic Spacer and Microsatellite Markers	AFF	01-02-04-0119 EA001	RM198,500
188.	Food Science and Biotechnology	Suraini Abd. Aziz	Degradation of lignocellulosic agro-wastes using ligninase and laccase from locally isolated fungus (white-root basidomycetes)	BAB	09-02-04-0351 EA001	RM159,000
189.	Food Science and Biotechnology	Tan Chin Ping	Production of Natural Flavoring and Coloring Powders from Local Edible Plants by Using Spray Drum and Freeze Drying Methods	AFF	03-02-04-0168 EA001	RM184,000
190.	Food Science and Biotechnology	Tan Chin Ping	Application Of High Processing In preservation Of Selected Local Fruit Products	AFF	03-02-04-0493 EA001	RM208,000
191.	Food Science and Biotechnology	Yaakob Che Man	Detection of Lard in Food Products By Advance Instrumental Techniques	AFF	03-02-04-0418 EA001	RM225,600
192.	Food Science and Biotechnology	Yaakob Che Man	Development and Application of Rapid Methods for Analysis of Fat and Oil Products Using Fourier Transform Infrared (FTIR) Spectroscopy	SAE	09-02-04-0457 EA001	RM180,000
193.	Forestry	Ahmad Said Sajap	Foraging dynamics and nutritional ecology of subterranean termites, Coptotermes spp. pest of structural timber in buildings and landscapes	MEE	01-02-04-0012 EA001	RM91,000
194.	Forestry	Faizah Abood	Insect - wood relations of powderpost beetles with emphasis on establishing standard methods for durability and preservative efficacy tests	AFF	03-02-04-0144 EA001	RM174,300
195.	Forestry	Faridah Hanum Ibrahim	Plant diversity and conservation in Perlis State Park	AFF	01-02-04-0021 EA001	RM163,760
196.	Forestry	Jalaluddin Harun	Properties of medium density fiberboard [MDF] manufactured from new Rubber wood species and clones	SAE	03-02-04-0406 EA001	RM92,600
197.	Forestry	Lim Meng Tsai	The ecology and productivity of Azadirchta excelsa (Sentang) plantations	AFF	01-02-04-0056 EA001	RM141,600
198.	Forestry	Mohamed Zakaria Hussin	Understorey birds species as health indicator of forest ecosystem	AFF	08-02-04-0242 EA001	RM191,796
199.	Forestry	Mohd. Ariff Jamaludin	Enhanced molding compound in the design and manufacture of interior building components	SAE	03-02-04-0153 EA001	RM291,000
200.	Forestry	Mohd. Ariff Jamaludin	Build-up beams in the manufacture of structural building components	SAE	03-02-04-0150 EA001	RM114,000
201.	Forestry	Nor Aini Ab Shukor	Variation in the multiple leader growth habit of known genotypes of four important Acacia species	AFF	01-02-04-0093 EA001	RM116,700
202.	Forestry	Nor Aini Ab Shukor	Provenance Variation Of Shorea Leprosula	AFF	01-02-04-0492 EA001	RM123,700
203.	Forestry	Zaidon Ashaari	Utilization of bamboo culms for structural bamboo plywood	SAE	03-02-04-0173 EA001	RM128,040
204.	Human Ecology	Ahmad Tarmizi Talib	Religious Tolerance: A Comparative Study Between Malaysia and Indonesia	SSH	07-02-04-0727-EA001	RM143,000
205.	Human Ecology	Elias Saion	Development and characterizations of high performance radiosensitive polymer dosimeters	SAE	09-02-04-0275 EA001	RM188,200
206.	Human Ecology	Husniyah Abd. Rahim	Pengetahuan, Sikap dan Amalan Penggunaan Kredit di kalangan di Malaysia	SAE	07-02-04-0227 EA001	RM108,200
207.	Human Ecology	Jariah Masud	The development of rural micro and small family enterprise	SSH	07-02-04-0735-EA001	RM147,000
208.	Human Ecology	Jayum A. Jawan	Adaptation, Transformation and Aspiration of Urban Squatters in Sarawak	SSH	07-02-04-0229 EA001	RM162,800
209.	Human Ecology	Laily Paim	Penggunaan dan Gaya Hidup Lestari di Kalangan Pegawai di Sektor Awam	SSH	07-02-04-0736-EA001	RM144,200

[1] **Data presented IRPA RM-8 (as at Cycle 1, 2004); Total 416 EAR Grants, sorted by PTJ & Name.**

to be continued...

†The description of the some of the above Inventions and Innovative research products available for commercialisation at UPM are contained in the books—"R&D at UPM: Creating New Frontiers of Innovative Research", First Edition, and "R&D at UPM: Research Snapshots", First Edition, Editors: Nayan Deep S. Kanwal, Mohd. Shahwahid Hj. Othman and Sidek Hj. Abd. Aziz, Published by Research Management Centre (RMC), UPM, available from Publications & Promotion Unit, Administration Building, Universiti Putra Malaysia, 43400 UPM, Serdang, Selangor Darul Ehsan, Malaysia, Tel: +603 8946 6028 / 8946 6192, Fax: +603 8942 6539, e-mail: rschinfo@admin.upm.edu.my

Synthesis Reportage

NewsBriefs

Improving by leaps and bounds

Prof. Zulkifli Shamsuddin served as the foundation director, RMC from Sept.2001 to June 2003

Prof. Mohd. Shahwahid Hj. Othman served as the second director, RMC from June 2003 to Feb 2005

Prof. Zulkifli Idrus, the new incoming director, RMC effective 1st March 2005

It has only been hardly three and a half years since Research Management Centre (RMC) was established by the founding director, Professor Zulkifli Shamsuddin in September 2001. Major transformations occurred as we all seek to fulfil our vision of a world class research intensive university. It was indeed a year of changes as we progressed in facilitating to expand alliances and reinforce industrial partnerships to enhance the overall impact. UPM through RMC further consolidated a pool of researchers with a sharp focus on research excellence when Professor Mohd. Shahwahid Hj. Othman took over as the second director of Research Management Centre in June 2003. RMC treats research as an investment to innovation. It places a high emphasis on commercialisation of research including patenting, and development. Advances in internationally competitive infrastructure, research funding, major research collaborations and quality research training have enhanced our research profile tremendously.

Buzzing with excitement, filled with pomp and splendour, Professor Zulkifli Idrus, RMC's new incoming director effective 1st March 2005, says he is committed to do the very best in order to elevate the image of Research Management Centre as UPM's investment to innovation. We will strive harder to achieve better results by assisting academicians in research and recognising the importance of cutting-edge relevance, with potential for economic spin-offs.

Invention, Research and Innovation Exhibition 2005

The Research Management Centre, UPM organised the Invention, Research and Innovation 2005 exhibitions or *Pameran Rekacipta, Penyelidikan & Inovasi 2005* (PRPI 2005) from 1-19 March 2005 at various faculties and institutes across the university in order to further promote research. The opportunity gave many young talents to exhibit their new innovations and R&D products.

A total of about 920 exhibits from various faculties and institutes were displayed at this eventful exhibition. A total of 481 awards comprising gold, silver and bronze medals were seized by our vibrant scientists and researchers.

Faculty of Science won the highest number of awards, followed by Engineering, Medicine and Health Sciences, Human Ecology and Agriculture.

Commitment to do very best

UPM will be at your service, assisting and promoting your research achievements internationally. Four of the internationally acclaimed largest research product and invention tradeshows, **Invention & New Product Exposition (INPEX)**, *Pittsburgh, USA*; **British Invention Show (BIS)**, *London, UK*; **International Exhibition of Ideas, Inventions & New Products (IENA)**, *Nuremberg, Germany*; and the **Eureka Fair**, *Brussels, Belgium* have appointed the Research Management Centre (RMC), Universiti Putra Malaysia as the Secretariat for Malaysian participants from Malaysia. The RMC team at Universiti Putra Malaysia will be involved in all aspects of the shows and assist you in any way. It is a reflection of varsity strength, and at the same time, a good exercise to boost self-esteem!

If you are interested to participate in any of these above international shows and would like to exhibit your research products or new inventions, and are seeking for international recognition and awards, please contact Dr. Fakhru'l-Razi Ahmadun, Deputy Director, Publication, Promotion and System Unit, Research Management Centre, 4th Floor, Administrative Building, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia. You may also contact Azrizam Esam/ Nurhaznita Mahmood at 03 8946 6191 for any queries or assistance that you may require.

Please visit our website at http://www.rmc.upm.edu.my/research2005/exhibitions2005.pdf or http://www.rmc.upm.edu.my/research2005/index.php for more details

Please note INPEX will be held from 8-11 June 2005 at Pittsburgh, USA. All completed entry forms for participation in the exhibition should reach Research Management Centre, UPM by 30 April 2005. You may visit the above website for details of other forthcoming exhibitions in 2005.

Malaysia Toray Science Foundation Prize

Dr. Latifah Saiful Yazan from the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia received a grant of RM35,000 under the Malaysia Toray Science Foundation Prize on 13 December 2004 for her research on the Mechanisms of damnacanthal-induced apoptotic cell death in the T-lymphoblastic leukaemia cells (CEM-SS).

"Malaysia is very fortunate to be bestowed by rain forests that are known for their richness in flora and fauna. A lot of researches have been carried out to discover the medicinal properties of the plants, especially on the anticancer activities", says Latifah. Nevertheless, less attention has been given to the mechanisms lying behind it. I think that is the key word that attracts the evaluation committee of selecting this project to receive the grant. I really hope that this work can be a model system for the other future active compounds/plants, thus giving us more understanding on the disease itself and also the cure, adds Latifah.

Incidentally, Latifah also won the MAKNA Cancer Research Award 2004. The award carried RM20,000 as research grant. *(Turn to centre page for pictorial news.)*

Vice-chancellor's Visit to Poland

Professor Dato' Dr. Ir. Mohd. Zohadie Bardaie, Vice Chancellor—UPM, Professor Dr. Mohd. Azmi Lila, Director—Institute of Bioscience and Dr. Jalaluddin Harun, Head—Bio-Engineering Lab successfully visited Wroclaw University of Technology (WUT), Wroclaw and Jagiellonian University, Krakow in Poland from 27 November to 5 December 2004 on invitations from Rectors of the above universities to pursue academic, scientific and technical cooperation between Poland and Malaysia.

The primary objective of UPM's visit to Poland was to establish S&T collaboration between UPM and highly rated Polish universities with a major focus on Biotechnology, and Biocomposite technology especially on Kenaf fibre development.
A joint research proposal is being prepared between Bio-Engineering Laboratory, ITMA, UPM and Department of Mechanical Engineering, WUT. Dr. Jalaluddin Harun (UPM) and Prof. Dr. Marek Kozlowski (WUT) have been identified to lead the bilateral project between the two institutions. In addition, Malaysian Institute for Nuclear Technology Research (MINT) has been identified as the third collaborator in this project.

An MOU between UPM and Wroclaw University of Technology is proposed, and is soon expected to be signed which would offer tremendous opportunities for both institutions to forge more collaborations.

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Letters to the Editor

If you have any comments about the content of the publication or any contributions that you may wish to make for the forthcoming issues, please send them to: The Managing Editor, *Synthesis*, Publication and Promotion Unit, Research Management Centre, 4th Floor, Administration Building, 43400 UPM, Serdang, Selangor, Malaysia or via the Internet to editor@rmc.upm.edu.my. The editor reserves the right to edit articles for clarity and space before publication.

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Synthesis is the first and only quarterly R&D digest at Universiti Putra Malaysia published in March, June, September and December with the focus on award-wining innovations. It covers research happenings emerging from the various faculties and institutes across the university and provides a brief summary of some of the important research findings of the study conducted at UPM. It brilliantly features special topics that are of national interest in various fields and disciplines.

Scientists must be made aware of how important the impact of their work is and its possible applications on society and public opinion. It is hoped that this digest will provide the opportunity to interact particularly through feedback or direct mail to the scientist from either the private sector or by scientists from other government research institutions.

Synthesis is the official research bulletin of the University and is published by Research Management Centre. It is available free of charge to the academic community.

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Research Management Centre

UNIVERSITI PUTRA MALAYSIA
Chancellory
Administration Building
43400 UPM, Serdang,
Selangor Darul Ehsan
Malaysia

Tel
+603 8946 6028 / 6192 / 6183
Fax
+603 8942 6539

E-mail
editor@rmc.upm.edu.my
ndeeps@admin.upm.edu.my
rschinfo@admin.upm.edu.my

Website
http://www.admin.upm.edu.my/research
http://www.rmc.upm.edu.my/